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RHEUMATIC
DISEASE CLINICS
OF NORTH AMERICA

Rheum Dis Clin N Am 32 (2006) 703–719

Parathyroid Hormone Update

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Osteoporosis afflicts an estimated 10 million United States citizens, and approximately one in two women and one in four men over the age of 50 will suffer from an osteoporosis-related fracture in their remaining lifetimes [1]. US Food and Drug Administration (FDA)-approved therapies for the treatment and prevention of osteoporosis include calcium and vitamin D supplements and antiresorptive therapies, such as bisphosphonates, estrogen, selective estrogen receptor modulators, and calcitonin. Recombinant human parathyroid hormone (rhPTH) and recombinant bioactive fragments of human parathyroid hormone are emerging as a unique new class of treatment options for osteoporosis. They are the only anabolic (as opposed to antiresorptive) agents available for clinical use. In 2002 the FDA approved teriparatide, a recombinant form of the N-terminal of endogenous human PTH known as rhPTH (1-34), for patients who have osteoporosis and are at high risk for fracture. A new drug application for the full-length recombinant peptide rhPTH (1-84) is under review with the FDA. This article briefly reviews the physiology and rationale for the use of PTH for the treatment of osteoporosis, and provides a more detailed update on the application of recent clinical trials of PTH to clinical practice. Table 1 summarizes the outcomes of recent clinical trials of PTH in human subjects.

Nancy Lane's work on this project is supported by the following grants from the National Institutes of Health: K24-ARO48841; RO1-AR43052.

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0889-857X/06/$ - see front matter
doi:10.1016/j.rdc.2006.07.005 *rheumatic.theclinics.com*

Table 1
Summary of clinical trials for rPTH

Investigators	Population	Intervention	Effect on BMD	Effect on fracture risk
Neer et al DB, PC	1637 postmenopausal women with osteoporosis	20 or 40 μg rhPTH (1-34) vs. placebo; 21 mo.	Increase at LS, TH, and FN	65%–69% risk reduction vertebral fractures; 35%–40% risk reduction nonvertebral fractures.
Hodsman et al DB, PC	106 postmenopausal women with osteoporosis	50, 75, or 100 μg rhPTH (1-84) vs. placebo; 12 mo.	Increased at LS	N/A
Ettinger et al DB, PC	2532 postmenopausal women with osteoporosis	100 μg rhPTH (1-84) vs. placebo; 18 mo.	Increased at LS, TH, and FN	63%–66% risk reduction in vertebral fractures
Orwoll et al DB, PC	437 men with T scores < -2.0	20 or 40 μg rhPTH (1-34) vs. placebo; 11 mo.	Increased at LS and FN	N/A
Kurland et al DB, PC	23 men with osteoporosis	25 μg hPTH (1-34) vs. placebo; 18 mo.	Increased at LS and FN	N/A
Lane et al	51 postmenopausal women with osteoporosis on HRT and chronic steroids	25 μg hPTH (1-34) vs. placebo; 12 mo. treatment, 24 mo. follow-up.	Increased at LS; delayed increased at FN and TH 1 y after treatment.	N/A
Black et al (year 1) DB, PC	238 postmenopausal women with osteoporosis or at high risk	100 μg rhPTH (1-84) vs. combination with alendronate vs. alendronate alone; 12 mo.	Equally increased at LS in the rhPTH and combination groups	N/A
Finkelstein et al DB, PC	83 men with T scores < -2.0	40 μg hPTH (1-34) vs. combination with alendronate vs. alendronate alone; 30 mo.	Increased at LS and FN in the PTH-alone group	N/A